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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/711,944	11/15/2000	Ken Ozawa	107878	8534

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OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER

SONG, HOON K

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/711,944

Applicant(s)

OZAWA, KEN

Examiner

Hoon K Song

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☒ Claim(s) 10 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

Claim 10 is objected to because of the following informalities: Spelling error "ossilation" in line 11. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-14 and 16-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki (US 5627627).

Regarding claim 1, Suzuki teaches a method that exposes a second object by transferring a pattern of a first object with exposure beam, and successively exposes a plurality of divided regions having different target exposure levels defined on said second object, by emitting pulses of the exposure beams from a pulsed energy source and moving said first object synchronously in relation to said second object with respect to the exposure beam, comprising the steps of (abstract):

setting a transmittance of light reducing member (3) disposed in an optical path of the exposure beam based on at least one target exposure level (column 6 line 9+, figure 4); and

adjusting an exposure level control parameters when exposing the divided regions having different target exposure levels according to individual target exposure

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levels without changing the selected transmittance of the light reducing member (column 8 line 57+).

Regarding claim 2, Suzuki teaches that said exposure level control parameters include at least one parameter from a group of parameters that includes a width of the exposure beam on the second object in the moving direction of the second, a moving speed of the second object, an oscillation frequency of the exposure beam produced by the pulsed energy source, and an energy of the exposure beam emitted from the pulsed energy source (column 8 line 57+).

Regarding claim 3, Suzuki teaches that said transmittance of light reducing member is determined according to a minimum target exposure level in the plurality of exposure levels (column 6 line 8+).

Regarding claim 4, Suzuki teaches that said target exposure levels are assigned to individual divided regions according to distances from a center of the second object.

Regarding claim 5, Suzuki teaches that 5. A method that illuminates a first object with exposure beam and that successively exposes a plurality of divided regions defined on a second object with said exposure beam, comprising the steps of:

determining different levels of target exposure levels for said plurality of divided regions defined on the second object (column 6 line 8+, figure 4); and

setting exposure levels of the exposure beam required for each divided region by changing exposure parameters which is changeable without mechanically switching optical components or performing test emissions of the exposure beam, when

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successively exposing the divided regions defined on the second object (column 8 line 57+, second light quantity controller).

Regarding claim 6, Suzuki teaches that said target exposure levels for a plurality of divided regions is predetermined by exposure testing using an object that is deemed equivalent to the second object (abstract).

Regarding claim 7, Suzuki teaches that said exposure beam is comprised by pulses of laser beam output from a pulsed light source, the second object and the first object are moved in synchronization with respect to the exposure beam, and at least one of the exposure parameters including an oscillation frequency of the pulsed light source, a target pulse energy of each pulse emitted from the pulsed light source, and a scanning speed of the second object, is changed to set an exposure level of the exposure beam to each divided region (abstract).

Regarding claim 8, Suzuki teaches a light reducing member alters transmittance of the exposure beam by switching luminance of the exposure beam on the second object over several stages, and a common value of transmittance is used for exposing different divided regions (figure 3).

Regarding claim 9, Suzuki teaches that said transmittance of light reducing member is chosen based on a minimum value of exposure level selected from a plurality of target exposure levels for a plurality of divided regions defined on the second object (column 6 line 34+).

Regarding claim 10, Suzuki teaches an apparatus that illuminates a first object with exposure beam and that successively exposes a plurality of divided regions defined on a second object with said exposure beam (abstract), comprising:

a pulsed light source (1) that generates pulses of light to serve as an exposure beam:

a stage system that moves the first object synchronously with the second object (figure 1);

a memory section (23) that stores target exposure levels in a plurality of different levels for a plurality of divided regions defined on the second object; and

a control system (16) that changes at least one exposure parameter when successively exposing the plurality of divided regions defined on the second object according to the target exposure levels stored in the memory section, wherein said one exposure parameter includes oscillation frequency of the pulsed light source, target per-pulse energy of the pulses emitted from the pulsed light source, and speed of scanning the second object controlled by the stage system (abstract).

Regarding claim 11, Suzuki teaches a light reducing member is provided between said pulsed light source and said second object to switch transmittance of the exposure beam in a plurality of stages (figure 1).

Regarding claim 12, Suzuki teaches a method that successively exposes a plurality of divided regions defined on a second object by projecting an image of a pattern through a projection optical system on a first object onto said second object, comprising the steps of:

detecting a level of reflected light reflecting from the second object or an evaluation object in place of the second object through the projection optical system (abstract, column 6 line 8+); and

setting a target exposure level for each of the plurality of divided regions defined on the second object based on the result of the detecting step (abstract, column 8 line 57+).

Regarding claim 13, Suzuki teaches an apparatus that successively exposes a plurality of divided regions defined on a second object by projecting an image of a pattern through a projection optical system on a first object onto said second object, comprising:

a detector that detects a level of reflected light reflecting from the second object through the projection optical system (abstract, column 6 line 8+); and

a control system that determines a target exposure level for each of the plurality of divided regions according to output data from the detector (abstract, column 8 line 57+).

Regarding claim 14, Suzuki teaches that said detector is used also to adjust imaging characteristics of the projection optical system (figure 1).

Regarding claim 16, Suzuki teaches that said control system determines a target integrated exposure level (count) for each divided region of the plurality of divided regions defined on the second object according to output data from the detector related to respective distances from an approximate center of the second object (column 8 line 57+).

Regarding claim 17, Suzuki teaches a method that successively exposes a plurality of divided region defined on a second object by projecting an image of a pattern through a projection optical system on a first object onto said second object for using a exposure beam, comprising the steps of:

detecting condition of the surface of the second object;

obtaining plurality of target exposure levels corresponding to the position within the second object based on the result of the detecting step (column 6 line 8+);

setting a transmittance of light reducing member disposed in an optical path of the exposure beam based on at least one target exposure level ; and

adjusting an exposure level control parameters when exposing the divided regions according to individual target exposure level without changing the selected transmittance of the light reducing member (column 8 line 57+).

Regarding claims 18-23, Suzuki teaches that the steps of imprinting a device pattern on a workpiece (abstract, figure 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Takahashi (US 5526093).

Regarding claim 15, Suzuki fails teaches that said output data from the detector is dependent on a thickness of a photosensitive film applied on the second object.

Takahashi teaches an exposure apparatus having detector for detecting a distribution of a film thickness of a radiation sensitive layer on the substrate (abstract).

In view of Takahashi, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adopt the detecting method because the thickness of the insulate film and the thickness of the photosensitive material in the exposure step may become non-uniform (column 1 line 47+). Accordingly, one would be motivated to adopt the method because it would provide an exposure apparatus in which the line width variation or improper resolution can be reduced (column 1 line 65+).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon K Song whose telephone number is 703-308-2736. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 703-305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-4858 for regular communications and 703-308-7724 for After Final communications.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

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Hoon K. Song
December 2, 2002


ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800
